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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,242	10/16/2003	Richard D. Breault	C-3144	9404

7590 09/11/2006

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EXAMINER	
WANG, EUGENIA	
ART UNIT	**PAPER NUMBER**
1745	

DATE MAILED: 09/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/687,242	BREAULT ET AL.	
	Examiner	Art Unit	
	Eugenia Wang	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☒ Claim(s) *22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *See Continuation Sheet*.

Continuation of Attachment(s) 6). Other: Information about Alumina Insulation (insulator).

DETAILED ACTION

Claim Objections

1. Claim 22 is objected to because of the following informalities: There is a typographical error in the fourth line, where "and" should be --an--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 6, and 11-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Morrow et al. as evidence by ZICAR.

3. Regarding claim 1, Morrow et al. teaches a fuel cell stack [12] and a defined reaction portion [14] (column 4, lines 26-28). A component plate [16] is secured at the end of the reaction portion (column 4, lines 41-46). Additionally, Morrow et al. teaches a current collector [24] that is electrically connected with the end cell (column 4, lines 66-68; column 5, lines 1-6). The current collector has a lower thermal capacity than previously used heavy metals, which caused undesired thermal absorption from fuel

cells at the end of the stack (column 3, lines 36-40; column 1, lines 36-45). A desired electrical conductivity for the current collector, 25 siemens/centimeter or greater, is mentioned (column 4, lines 62-64). Although conductivity is not mentioned in the claim, electrical resistivity is mentioned. However, it would be obvious to one having ordinary skill in the art to know that conductivity is the inverse of resistivity. A simple conversion, shows that the desired conductivity of the claimed current collector falls within the range that Morrow et al. teaches.

$$resistivity = \frac{1}{conductivity}$$

$$at\_Claim's\_boundary:$$

$$resistivity = 100\_mircro - ohm\_cm$$

$$conductivity = \frac{1}{100\_micro - ohm\_cm}$$

$$conductivity = \frac{1}{100 * 10^{-6}\_ohm\_cm}$$

$$conductivity = 10000\_siemens/cm \geq 25\_siemens/cm$$

Morrow et al. also teaches an insulator [36], which is placed next to the current collector (column 5, lines 27-28). The insulator's thermal conductivity is not disclosed, however "ZAL-45 alumina insulation" material (column 5; lines 41-44) is disclosed as useful. This insulator has a thermal conductivity that falls within the range listed by the claim, as referenced by ZICAR Ceramic's "Alumina Insulation Type ZAL-45 &ZAL-45AA." The specific numbers for thermal conductivity can be found in the Characteristics & Properties section. Further regarding the insulator, Morrow et al. teaches its purpose, which is restricting of heat from the fuel stack though the current collectors (column 5,

lines 35-38). Therefore, total heat transfer rate across the insulator from the end cell being no greater than the heat generated by the end cell is an inherent property. Morrow et al. also teaches pressure plate [40], which is secured adjacent to the thermal insulator [36], which has the cross sectional area at least as large as the end cell component plate (column 5, lines 62-67).

4. Regarding claim 6, Morrow et al. teaches the stacked fuel cell assembly as described above. However, Morrow et al. teach neither a vacuum insulation panel nor the compressive strength. One property of "ZAL-45 alumina insulation" is that thermal conductivity is reduced if placed under a vacuum, as referenced by ZICAR Ceramic's "Alumina Insulation Type ZAL-45 &ZAL-45AA." Additionally, compressive strength is an inherent property of the insulating material.

5. Regarding claim 11, Morrow et al. teaches the stacked fuel cell assembly, as previously described. Additionally, Morrow et al. teaches that heavy dense metals have been used to construct the pressure plates (column 2, lines 36-38).

6. Regarding clam 12, Morrow et al. discloses the fuel cell, as previously mentioned. Additionally, he teaches a pressure plate that is made of an electrically non-conductive, non-metallic, fiber reinforced composite material (column 6, lines 7-10).

7. Regarding claim 13, Morrow et al. discloses the fuel cell stack assembly, as previously depicted. The collector extensions and electrical communications are not taught, however, they are parts, which are inherently used to collect electricity generated by fuel cells.

8. Regarding claim 14, Morrow et al. teaches the use of a thin, metal layer as a current collector (column 5, lines 50-51). Foil is defined as being metal in the form of thin, flexible leafs or sheets (*The American Heritage® Dictionary of the English Language, Fourth Edition*. Houghton Mifflin Company, 2004. 28 Aug. 2006. <Dictionary.com http://dictionary.reference.com/search?q=foil>). A thin metal layer fits the definition of a foil.

Claim Rejections - 35 USC § 102/103

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 2-5, 7-10 and 16-20 are rejected under 35 U.S.C. 102(2) as anticipated by or, in the alternative, under U.S.C. 103(a) as being unpatentable over Morrow et al.

12. Regarding claims 2-3 and 16-20, Morrow teaches the stacked fuel cell assembly, as previously described. Additionally, Morrow et al. teaches the fact that the thickness of the metal current collector with certain desired properties is dependant on the material it is made of (column 5, lines 56-61). It is also taught that more recent current collectors are thinner than previous ones (column 5, lines 56-57). Morrow does not teach specifics regarding sensible heat, thickness, and resistivity. However sensible heat and resistivity are inherent properties of a material, given a specific thickness. From the trend of diminishing thicknesses of metal current collectors, it would have been obvious to one having ordinary skill in the art at the time the invention was made to draw the conclusion that thicknesses of current collectors could vary with a propensity to choose thinner ones.

13. Regarding claims 4-5 and 7-10, Morrow et al. teaches the stacked fuel cell assembly as set forth above. Morrow et al. does not teach a specific thermal conductivity, thickness, or rate of heat transfer. Much like the current collector, heat transfer and thermal conductivity are inherent properties of a material, given a specific thickness. It would have been obvious to one having ordinary skill in the art at the time the invention was made to come to the conclusion that varying insulator thickness also alters the properties that are dependant on it.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. Claims 15 and 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Morrow et al.

16. Regarding claim 15, Morrow et al. teaches the stacked fuel cell assembly as previously described. Additionally, Morrow et al. teaches a current collector made of electrically conductive graphite material (column 2, lines 64-65). In an alternate embodiment, a thin conductive metal layer [39] is included as part of the current collector (column 5, lines 50-51). Morrow does not teach a current collector that is a metal-coated insulator. However, a metal coating on an insulator would still provide the same conductive property as a metal itself. For this reason, it would have been obvious to one having ordinary skill in the art at the time the invention was made to come to the conclusion that a metal coated insulator could work as a current collector.

17. Regarding claim 21, Morrow et al. teaches the stacked fuel cell assembly as set forth above. Additionally, Morrow et al. teaches a current collector made of electrically conductive graphite material (column 2, lines 64-65). In an alternate embodiment, a thin conductive metal layer [39] is included in the current collector; copper is given as an example of the material used (column 5, lines 50-51). Morrow et al. does not teach the use of the other materials that the claim suggests to use: tin, zinc, nickel, aluminum, gold, silver, alloys thereof, mixtures thereof, and the previously materials with gold plating being used for the current collector. Since all of the aforementioned metals are conductive any of the materials mentioned in the claim would have fit the description

given in Morrow et al. It would have been obvious to one having ordinary skill in the art at the time the invention was made as to which metals are conductive. Therefore, any of the claimed metal or metal combinations could be used under Morrow et al.'s teaching, even though only copper is mentioned by name.

18. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morrow et al in view of Hertel et al. Regarding claims 22-24, Morrow et al. teaches a fuel cell stack assembly, as set for above. However, Morrow et al. does not teach a power plant for supplying electricity to an external load, more specifically for transportation devices and stationary devices. Hertel et al. teaches that fuel cells are suited for usage in transportation vehicles, portable power plants, or stationary power plants (paragraph [001], lines 1-4). Additionally, Hertel et al. teaches that the electrical output generated by fuel cells are used to power electrical apparatuses, such as on-board space vehicles, or on-site generators for buildings (paragraph [002], lines 1-5). Using fuel cell power plants for external devices has already been suggested. Additionally, examples of both a transportation and stationary device were given as the external load. It would have been obvious to one having ordinary skill in the art at the time the invention was made that the electricity generated by the outlined fuel cell assembly stack could be used in a fuel cell power plant whose electrical energy was to be used in transportation and stationary applications.

19. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morrow et al. in view of Guthrie. The conductive end fuel cell stack assembly has already been set forth by Morrow et al. above. Morow et al. does not teach directing reactant fluids

through the stack of fuel cells. Guthrie teaches a fuel cell stack using a conductive end plate assembly, where reactants are directed into internal passageways of the end plate assemblies (column 4, lines 40-51; column 3, lines 1-16). Guthrie discloses the claimed method for flowing reactants except for sending the reactants through the whole stack of fuel cells. It would have been obvious to one having ordinary skill in the art at the time the invention was made to apply Guthrie's method of directing the reactants to the whole stack of fuel cells. This conclusion is obvious because it is known in the art that increased reactant surface area increases the speed of a reaction, in this case causing warm up during start up to occur more rapidly.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugenia Wang whose telephone number is 571-272-4942. The examiner can normally be reached on 8 - 4:30 Mon. - Fri., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EW

PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER